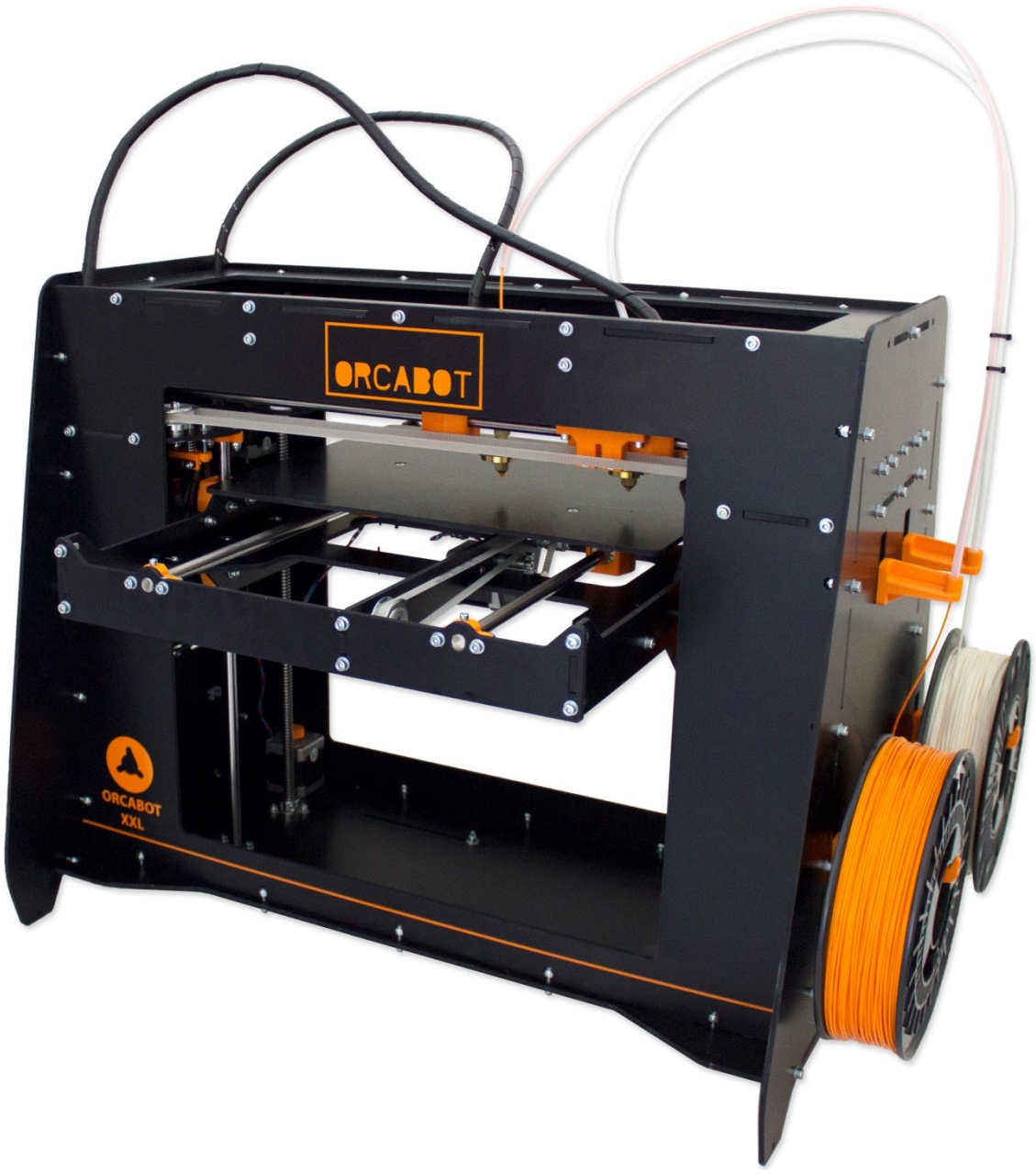
User manual: Orcabot XXL



User manual: Orca XXL

Version 1.4

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2. Welcome to the world of 3D printing

Thank you for choosing Orcabot as supplier for your 3D printing partner!

This user manual is designed to show you some basic steps in the 3D printing world. A world that is our future, full of challenges and opportunities.

It is essential that you read through this manual, as there are also some tips how to work safe and secure.

Let's start making amazing things!

3. Safety

	Safety alert symbols precede each safety message in this manual. These symbols indicate potential safety hazards that could harm you or others or cause product or property damage.	
	Warning:	The Orca generates high temperatures. Do not reach inside the machine when operating. Always allow the Orca to cool down first.
	Warning:	The Orca includes moving parts. Never reach the Orca when the machine is in operation.
	Warning:	Do not leave the Orca unattended during operation.
	Caution:	Only use the power supply provided with your Orca.
	Caution:	We recommend only to use materials supplied by Orcabot. Other materials can have unexpected properties with can influence the quality or worse.
	Caution:	In case of emergency disconnect power supply from wall socket.
	Caution:	Orca melts plastic during printing. Plastic odors are emitted during this operation. Make sure to set up the Orca in a well-ventilated area.

4. Specifications

Printing

Print technology:	Fused Filament Fabrication (FFF)
Layer resolution:	50 µm
Position resolution:	50 µm
Nozzle diameter:	0,35mm-0,4mm
Filament:	1,75mm Orcabot filament

Dimensions

Build volume:	360x280x230mm
Frame dimensions:	620x400x520mm
Total weight:	

Temperature

Ambient operating temperature:	10˚C - 40 ˚C
Storage temperature:	0˚C - 50 ˚C

Electrical

AC input:	88-264 VAC
Frequency range:	47-63 Hz
DC Voltage:	24V
Rated Current:	13A

5. FFF 3D-print technology

Fused filament fabrication (FFF) is an additive manufacturing technology commonly used for modeling, prototyping, and production applications.

FFF works on an "additive" principle by laying down material in layers; a plastic filament or metal wire is unwound from a coil and supplies material to produce a part.

The technology was developed by S. Scott Crump in the late 1980s and was commercialized in 1990.

6. Setting up the Orca

After unpacking the Orca, the next step is setting up the printer. A few things are important:

- The Orca must be placed on a smooth and level surface
- There must be an electric socket, recommended is a socket with an on/off switch
- It is recommended to choose a room or place which has a decent ventilation

Before testing and connecting the printer to the computer, choose a solid table or desk, to put the printer on. Next step is to install the glassplate (use the 4 clamps), spool holders and tube holders including tube at the right side of the machine.

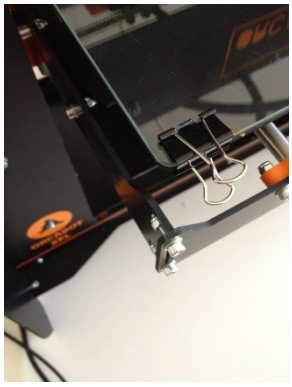


Fig.1: Glassplate

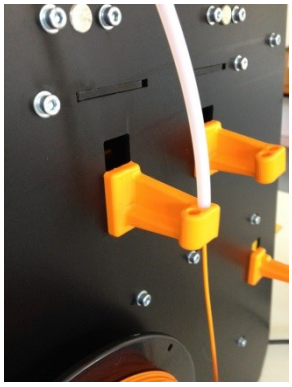


Fig. 2: Tubeholder

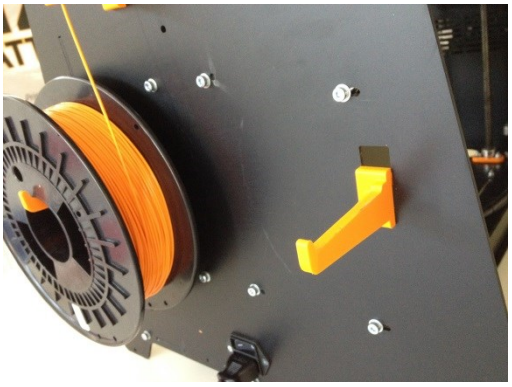


Fig. 3: Spoolholder

Fig. 4: Power cable and On/Off switch.

Next step is to connect the power cable. You can find the connection on the right side of the machine (at the bottom). Here you can also find the On/Off switch.

Switch the machine on and connect the Orca with a computer via the USB cable. You can find the USB port at the back of the machine. Above the USB port, there is another On/Off switch for safety.

Once the USB cable is connected, the computer will detect a new USB device on one of the COM ports. In the next chapter you can find the description how to install the printer driver and software.

7. Installing the software

Windows only, there is also an Apple OS package.

On the Orcabot website you can download the driver and software to control your Orca 3D printer.

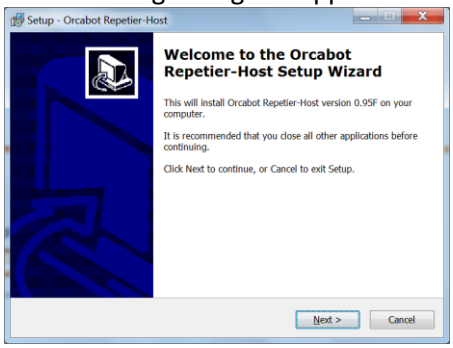
Step 1, Orcabot Repetier Host install

On the Orcabot website you can find the software for the Orcabot XXL.

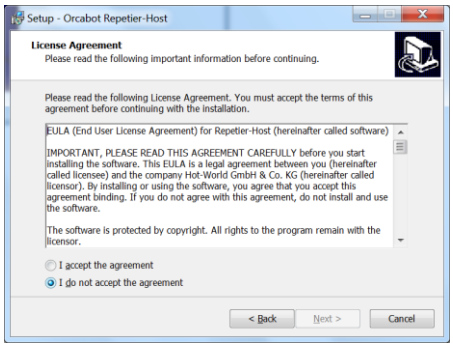
Go to Support; Downloads and click on: Orcabot Repetier Host Setup. The software will be downloaded. When double clicking on the executable, the software will start the installation.

First, choose your preferred language for the installation.

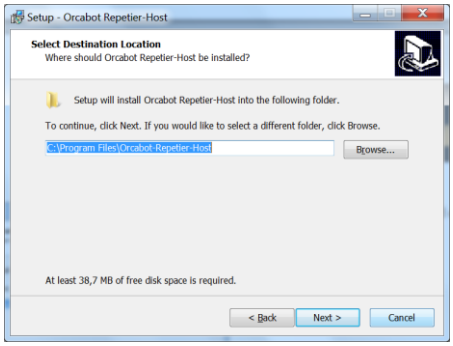
The following dialog will appear:


Setup - Orcabot Repetier-Host
Welcome to the Orcabot Repetier-Host Setup Wizard
This will install Orcabot Repetier-Host version 0.95F on your computer.
It is recommended that you close all other applications before continuing.
Click Next to continue, or Cancel to exit Setup.
Next >
Cancel

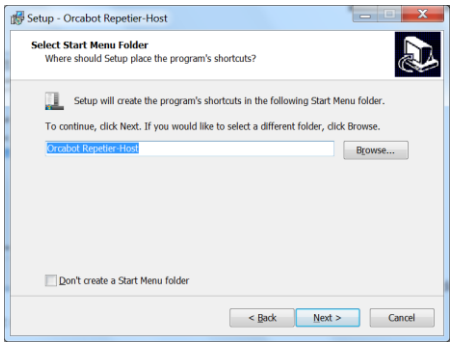
Click: “Next”


Setup - Orcabot Repetier-Host
License Agreement
Please read the following important information before continuing.
Please read the following License Agreement. You must accept the terms of this agreement before continuing with the installation.
EULA (End User License Agreement) for Repetier-Host (hereinafter called software)
IMPORTANT, PLEASE READ THIS AGREEMENT CAREFULLY before you start installing the software. This EULA is a legal agreement between you (hereinafter called licensee) and the company Hot-World GmbH & Co. KG (hereinafter called licensor). By installing or using the software, you agree that you accept this agreement binding. If you do not agree with this agreement, do not install and use the software.
The software is protected by copyright. All rights to the program remain with the licensor.
I accept the agreement
I do not accept the agreement
< Back
Next >
Cancel

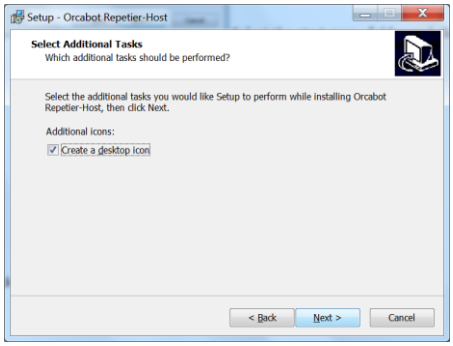
If you agree with the license agreement, select “I accept the agreement” and click “Next”.


Setup - Orcabot Repetier-Host
Select Destination Location
Where should Orcabot Repetier-Host be installed?
Setup will install Orcabot Repetier-Host into the following folder.
To continue, click Next. If you would like to select a different folder, click Browse.
C:\Program Files\Orcabot-Repetier-Host
Browse...
At least 38,7 MB of free disk space is required.
< Back
Next >
Cancel

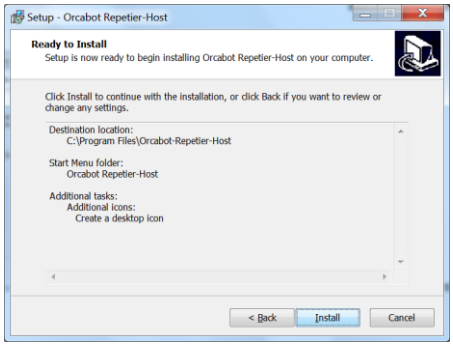
Select the destination folder and click “Next”.


Setup - Orcabot Repetier-Host
Select Start Menu Folder
Where should Setup place the program's shortcuts?
Setup will create the program's shortcuts in the following Start Menu folder.
To continue, click Next. If you would like to select a different folder, click Browse.
Orcabot Repetier-Host
Browse...
Don't create a Start Menu folder
< Back
Next >
Cancel

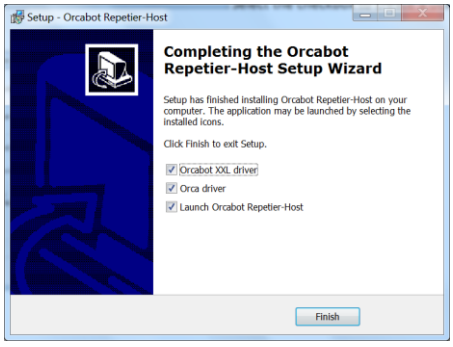
Select the start menu folder and click “Next”.


Setup - Orcabot Repetier-Host
Select Additional Tasks
Which additional tasks should be performed?
Select the additional tasks you would like Setup to perform while installing Orcabot Repetier-Host, then click Next.
Additional icons:
Create a desktop icon
< Back
Next >
Cancel

Select the checkbox to create a desktop icon and click “Next”.


Setup - Orcabot Repetier-Host
Ready to Install
Setup is now ready to begin installing Orcabot Repetier-Host on your computer.
Click Install to continue with the installation, or click Back if you want to review or change any settings.
Destination location:
C:\Program Files\Orcabot-Repetier-Host
Start Menu folder:
Orcabot Repetier-Host
Additional tasks:
Additional icons:
Create a desktop icon
< Back
Install
Cancel

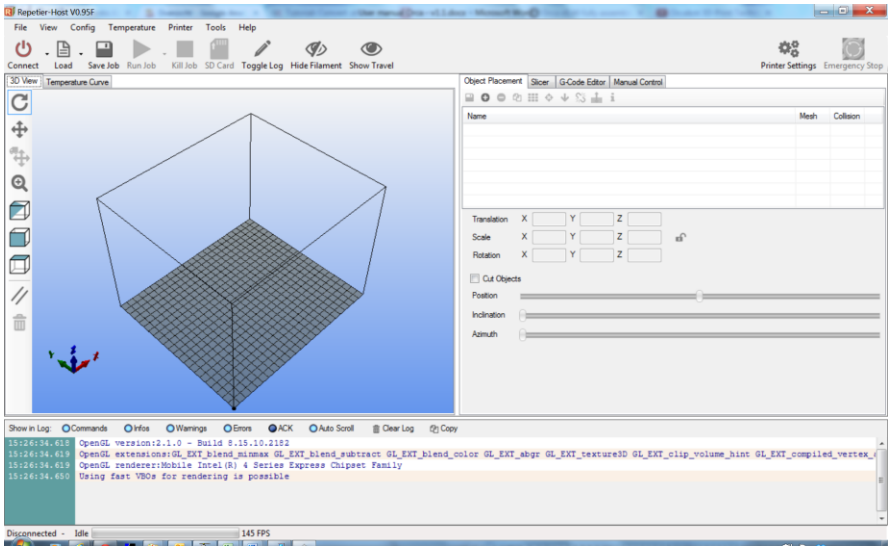
Click “Install” to proceed with the installation.


Setup - Orcabot Repetier-Host
Completing the Orcabot Repetier-Host Setup Wizard
Setup has finished installing Orcabot Repetier-Host on your computer. The application may be launched by selecting the installed icons.
Click Finish to exit Setup.
Orcabot XXL driver
Orca driver
Launch Orcabot Repetier-Host
Finish

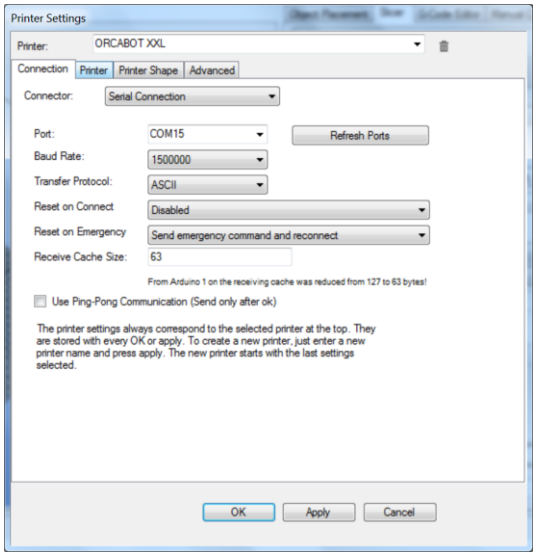
Finally click “Finish” to finish the installation.

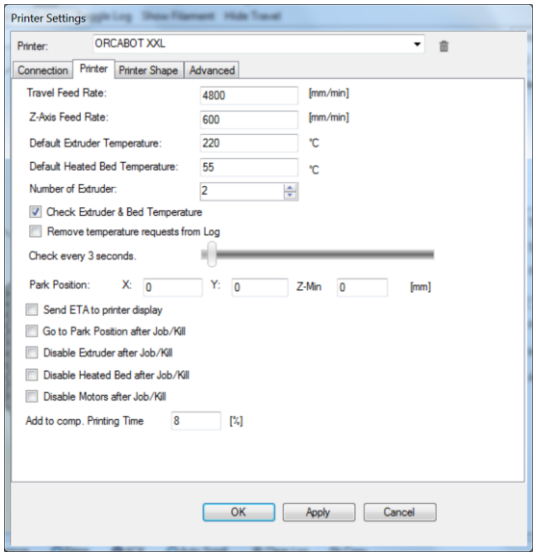
8. Printer Settings

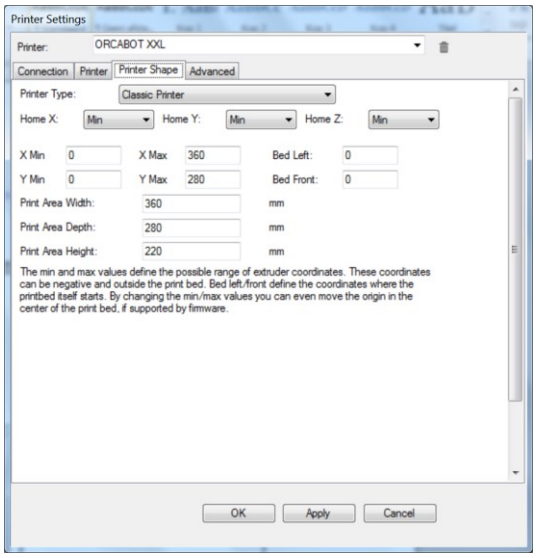
Start Orcabot Repetier Host and select “Printer settings” in the right top corner.

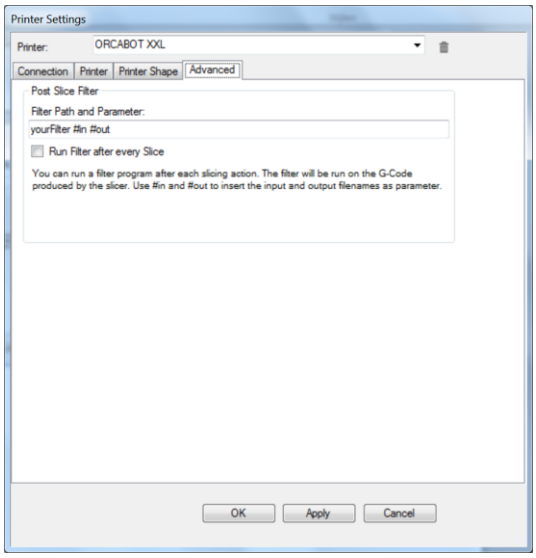

Repetier-Host V0.95F
File View Config Temperature Printer Tools Help
Connect Load Save Job Run Job Kill Job SD Card Toggle Log Hide Filament Show Travel
Printer Settings Emergency Stop
3D View Temperature Curve
Object Placement Slicer G-Code Editor Manual Control
Name Mesh Collision
Translation Scale Rotation
Cut Objects
Position Inclination Azimuth
Show in Log: Commands Infos Warnings Errors ACK Auto Scroll Clear Log Copy
OpenGL version:2.1.0 - Build 8.15.10.2182
OpenGL renderer:Mobile Intel(R) 4 Series Express Chipset Family
Using fast VBOs for rendering is possible
Disconnected - Idle 145 FPS

Please enter the following settings in the four TAB’s and after that press “Apply” and “OK”.


Printer Settings
Printer: ORCABOT XXL
Connection Printer Printer Shape Advanced
Connector: Serial Connection
Port: COM15 Refresh Ports
Baud Rate: 1500000
Transfer Protocol: ASCII
Reset on Connect Disabled
Reset on Emergency Send emergency command and reconnect
Receive Cache Size: 63
From Arduino 1 on the receiving cache was reduced from 127 to 63 bytes!
Use Ping-Pong Communication (Send only after ok)
The printer settings always correspond to the selected printer at the top. They are stored with every OK or apply. To create a new printer, just enter a new printer name and press apply. The new printer starts with the last settings selected.
OK Apply Cancel


Printer Settings
Printer: ORCABOT XXL
Connection Printer Printer Shape Advanced
Travel Feed Rate: 4800 [mm/min]
Z-Axis Feed Rate: 600 [mm/min]
Default Extruder Temperature: 220 °C
Default Heated Bed Temperature: 55 °C
Number of Extruder: 2
Check Extruder & Bed Temperature
Remove temperature requests from Log
Check every 3 seconds.
Park Position: X: 0 Y: 0 Z-Min 0 [mm]
Send ETA to printer display
Go to Park Position after Job/Kill
Disable Extruder after Job/Kill
Disable Heated Bed after Job/Kill
Disable Motors after Job/Kill
Add to comp. Printing Time 8 [%]
OK Apply Cancel


Printer Settings
Printer: ORCABOT XXL
Connection Printer Printer Shape Advanced
Printer Type: Classic Printer
Home X: Min Home Y: Min Home Z: Min
X Min 0 X Max 360 Bed Left: 0
Y Min 0 Y Max 280 Bed Front: 0
Print Area Width: 360 mm
Print Area Depth: 280 mm
Print Area Height: 220 mm
The min and max values define the possible range of extruder coordinates. These coordinates can be negative and outside the print bed. Bed left,front define the coordinates where the printbed itself starts. By changing the min/max values you can even move the origin in the center of the print bed, if supported by firmware.
OK Apply Cancel

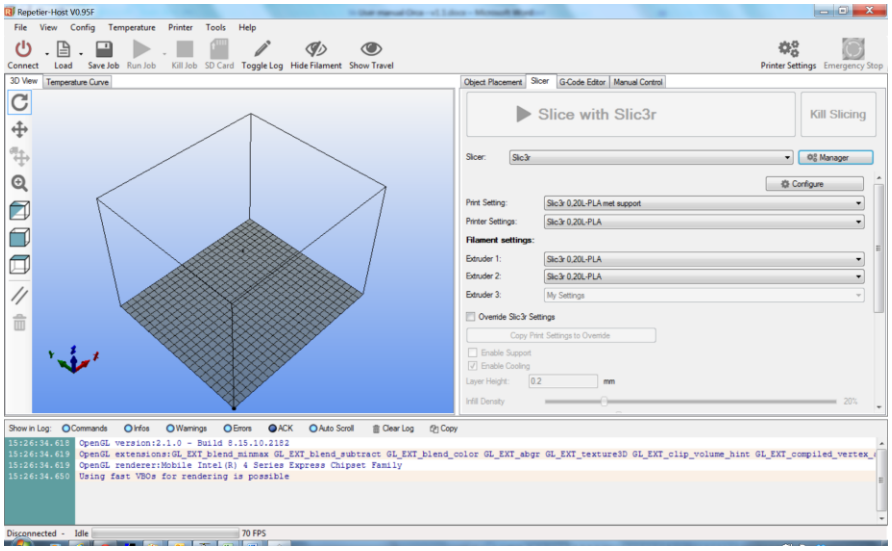

Printer Settings
Printer: ORCABOT XXL
Connection Printer Printer Shape Advanced
Post Slice Filter
Filter Path and Parameter:
yourFilter #in #out
Run Filter after every Slice
You can run a filter program after each slicing action. The filter will be run on the G-Code produced by the slicer. Use #in and #out to insert the input and output filenames as parameter.
OK Apply Cancel

9. Installing Print Profile

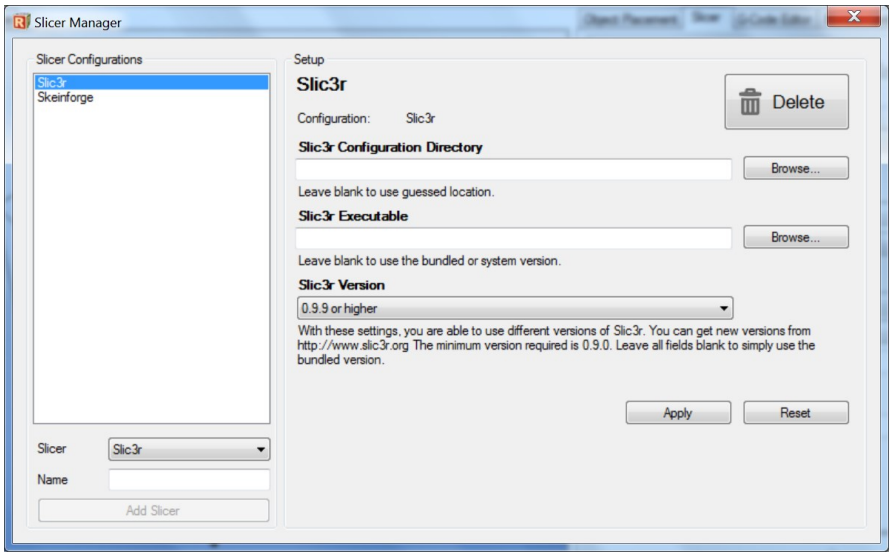
Next step is to install the latest Print Profiles in Orcabot Repetier Host (during the installation of Orcabot Repetier Host the basic printfiles are installed). These files include the layer height and settings for printing a specific material like: PLA, ABS, Nylon etc..

You can download the latest Repetier Print Profiles from the Orcabot website.

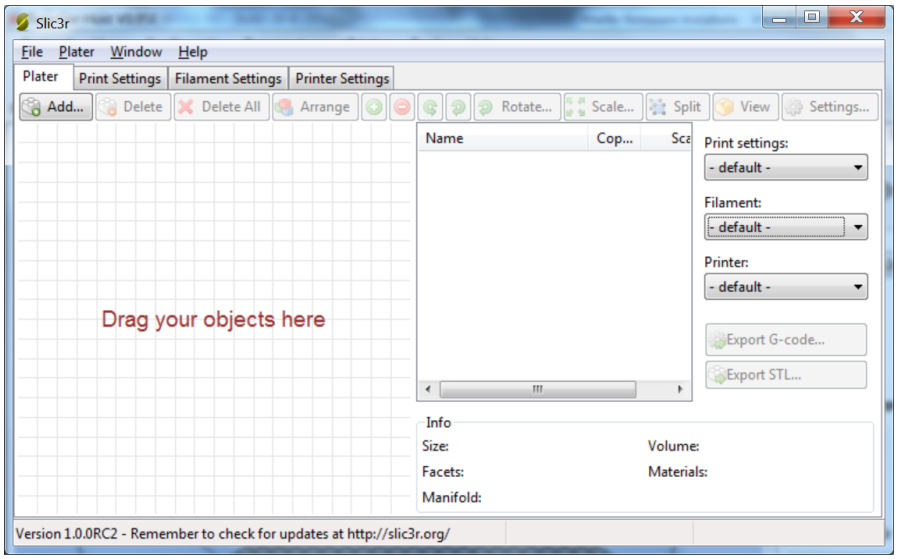
Go to the TAB Slicer and click on the button “Manager”.


Repetier-Host V0.95F
File View Config Temperature Printer Tools Help
Connect Load Save Job Run Job Kill Job SD Card Toggle Log Hide Filament Show Travel
Printer Settings Emergency Stop
3D View Temperature Curve
Object Placement Slicer G-Code Editor Manual Control
Slice with Slic3r
Kill Slicing
Slicer: Slic3r
Manager
Configure
Print Setting:
Printer Settings:
Filament settings:
Extruder 1:
Extruder 2:
Extruder 3:
Override Slic3r Settings
Copy Print Settings to Override
Enable Support
Enable Cooling
Layer Height: 0.2 mm
Infill Density
Show in Log: Commands Infos Warnings Errors ACK Auto Scroll Clear Log Copy
15:26:34.610 OpenGL version:2.1.0 - Build 8.15.10.2182
15:26:34.615 OpenGL extensions:GL_EXT_blend_minmax GL_EXT_blend_subtract GL_EXT_blend_color GL_EXT_abgr GL_EXT_texture3D GL_EXT_clip_volume_hint GL_EXT_compiled_vertex_
15:26:34.615 OpenGL renderer:Mobile Intel(R) 4 Series Express Chipset Family
15:26:34.650 Using fast VBOs for rendering is possible
Disconnected - Idle 70 FPS

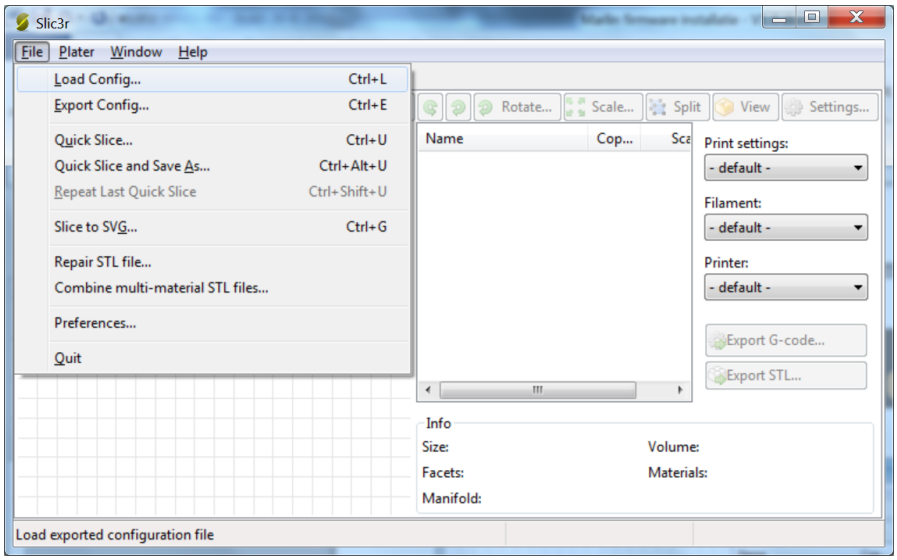
Select “Slic3r” at the left side of the dialog and click “Apply”.



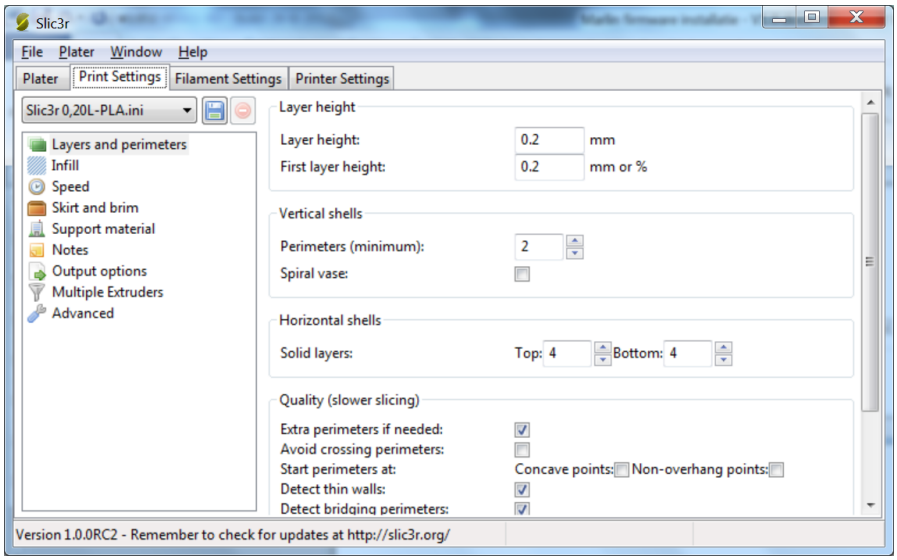
Next click “Configure”.



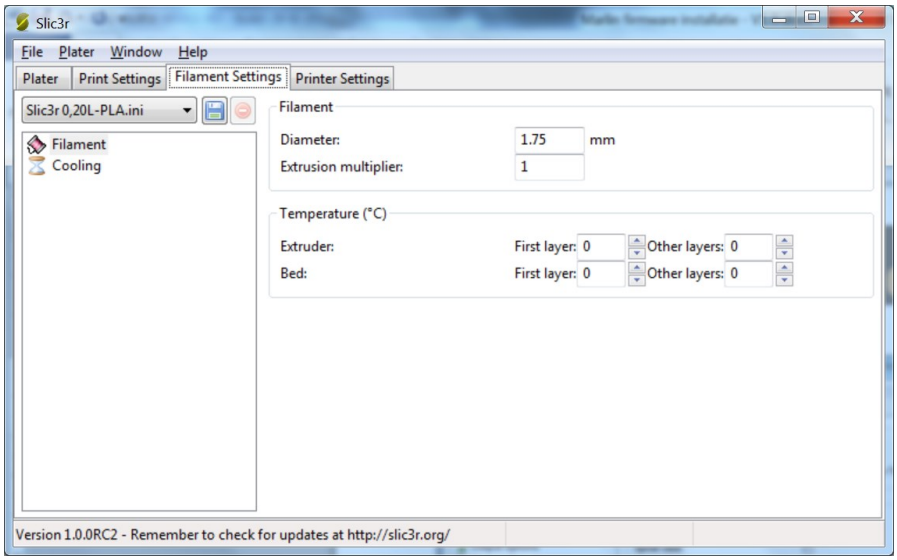
Click “File”; “Load Config” and select the Orca Slic3r Profile.



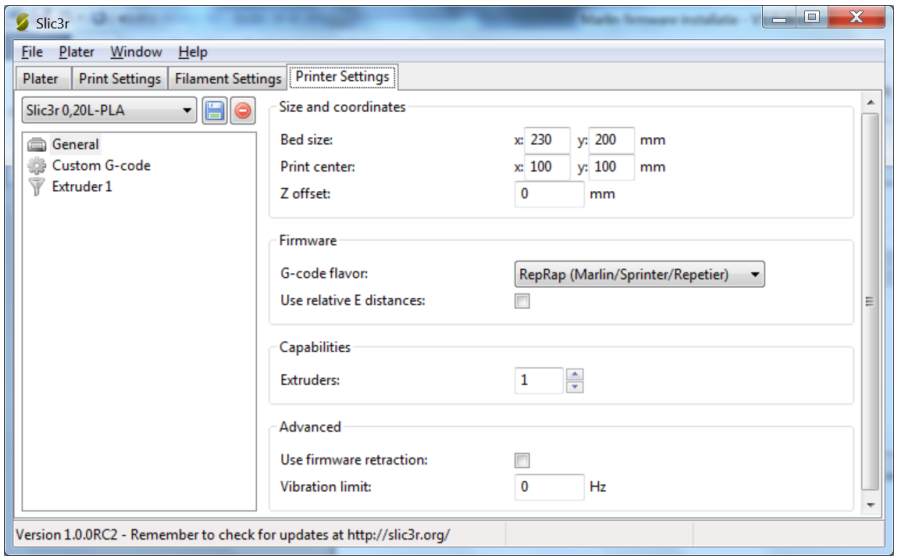
Go to the TAB “Print settings” and save the settings.



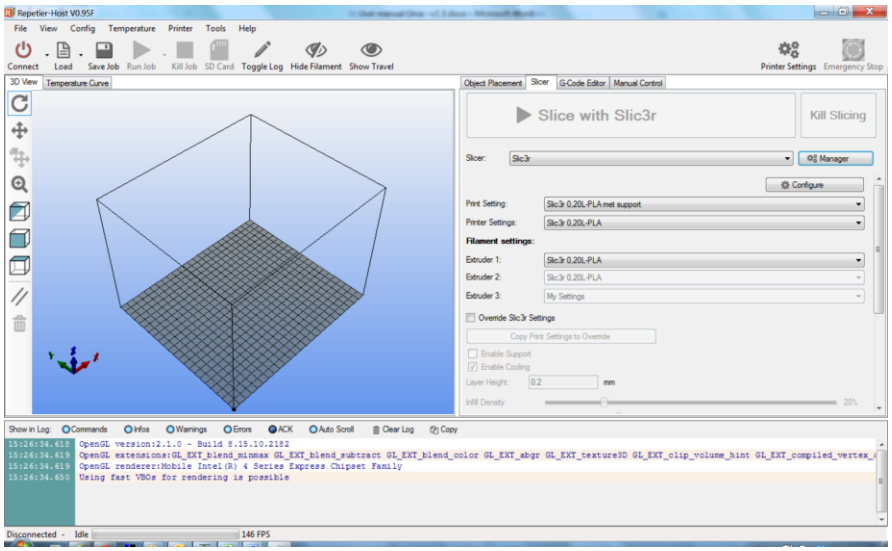
Go to the TAB “Filament settings” and save the settings.



Go to the TAB “Printer settings” and save the settings.

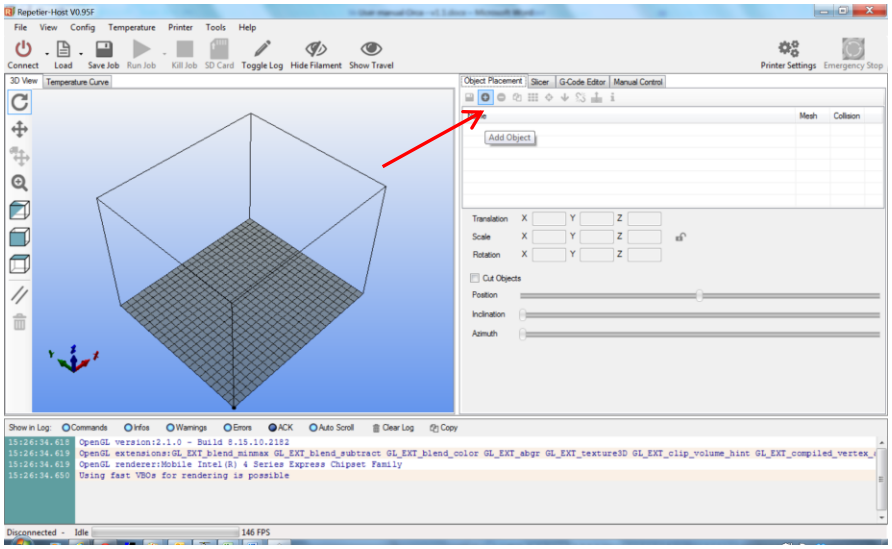


Make sure you also select the new profiles in the Repetier drop down menu's.



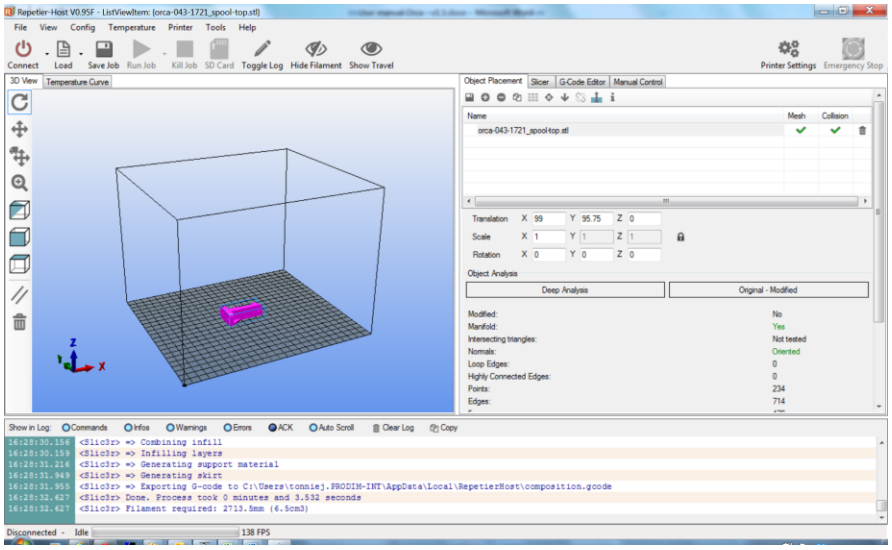
10. Prepare G-code for printing

Before anything can be printed, a 3D file must be exported to or saved as a ".STL" file. These files are suitable for 3D printing. Make sure when saving the file, that the Z-axis is pointing in the right direction (UP).

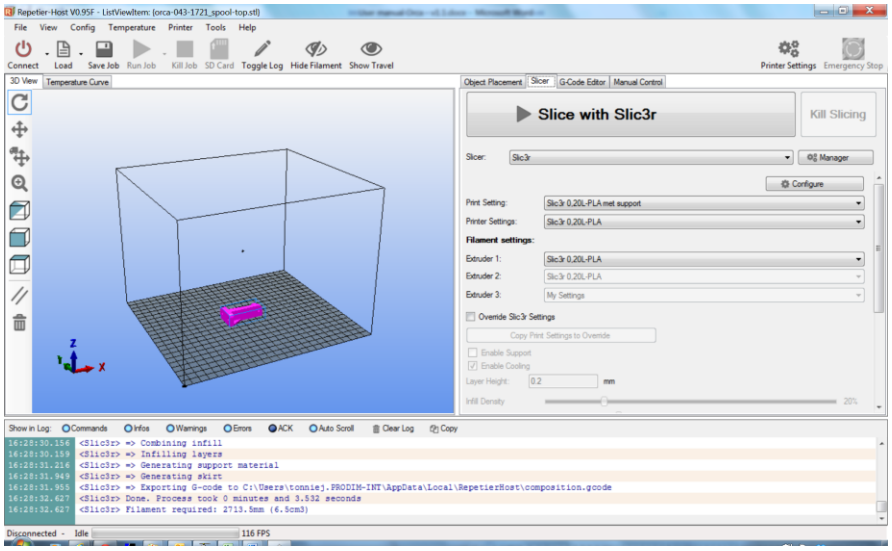


In Repetier STL files can be loaded and will be shown in 3D. Just click on the button "Add object" in the TAB Object Placement and choose the STL file or files. Everytime when a new object is loaded, it will be placed automaticaly in the screen and will be show in the list of STL objects. It is also possible tot manually move them with the mouse, or use the button: "Center object".

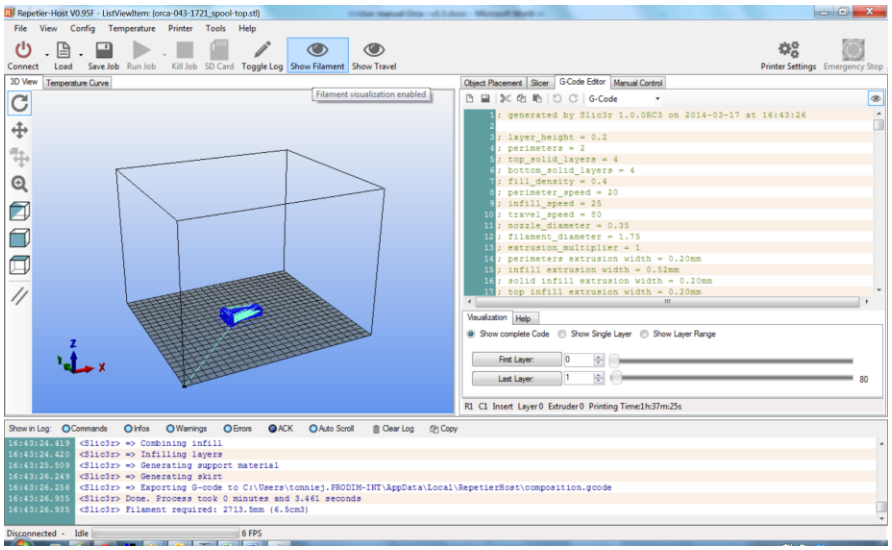
There is also the possibility to scale the models or place/rotate them with coordinates.



Next step is to Slice the Object. Go to the Slicer TAB and click “Slice with Slic3r”. This can take some time.



After the slicing is done, the program will automatically change to the tab G-code.



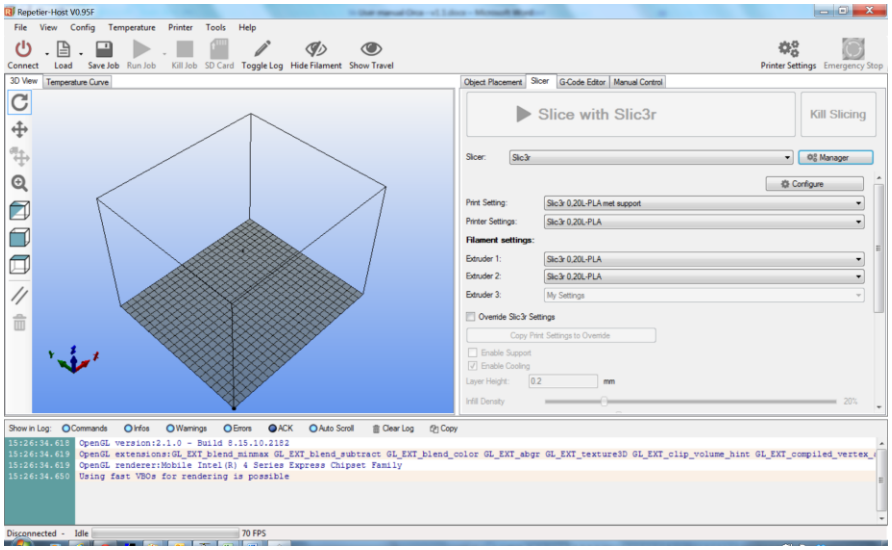
In the object screen a blue “layered” object will show up (if not click on the “Show Filament” button). The dark blue line show the object layer by layer. The light blue lines show the Z-movements (no printing).

You can save the G-code by pressing the Save Job button on top of the screen.

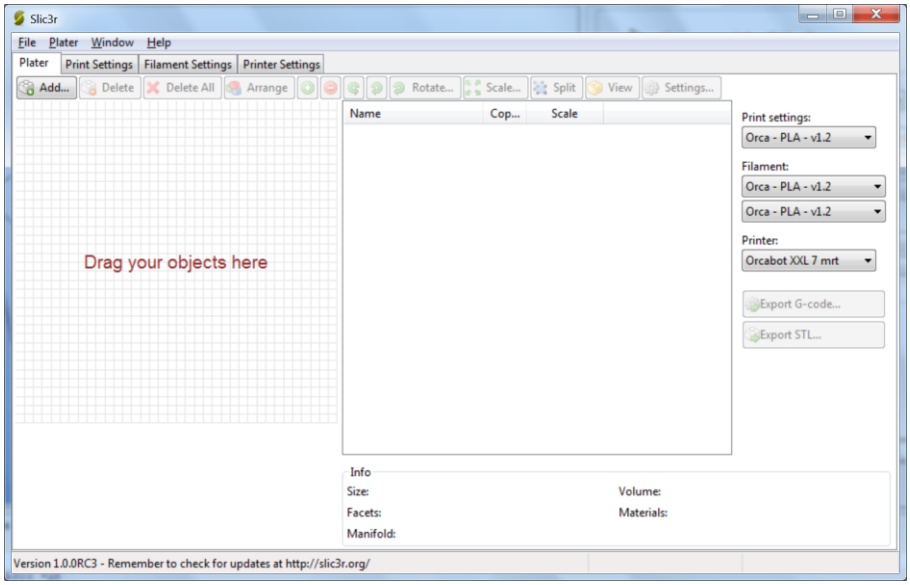
11. Prepare G-code for printing with dual extruder

For printing with dual extruder you need two STL files.

Open Slic3r via the button “Configure” on the TAB Slicer.



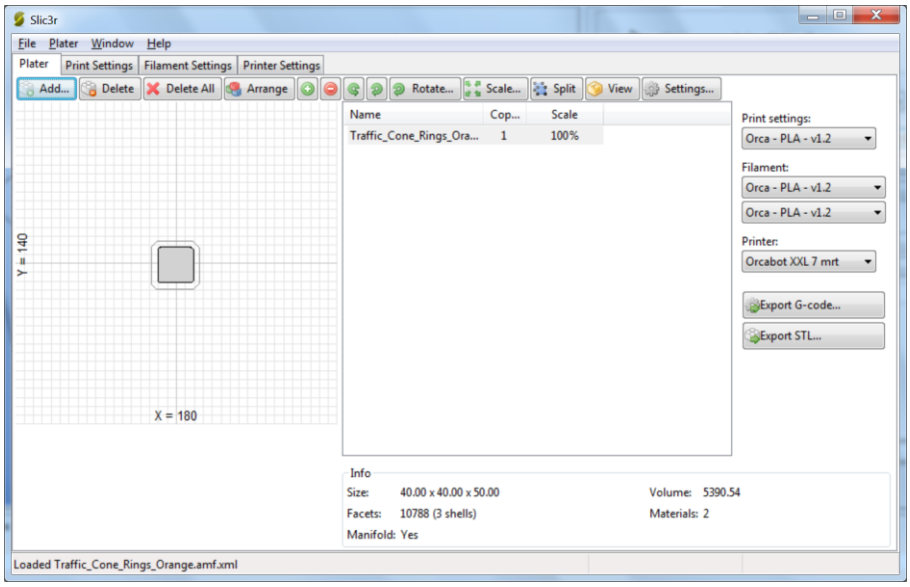
Go to File; Combine multi-material STL files…



After that, select the first file, click Open, select the second file, click open and click cancel. This sequence is also defining which spool will be used. Spool 1 / Extruder 1 will be used for file 1 and Spool 2 / Extruder 2 will be used for file 2.

Next step is to save the new file as an AMF file.

Click on the Add button and select the file. The file will appear on the screen.

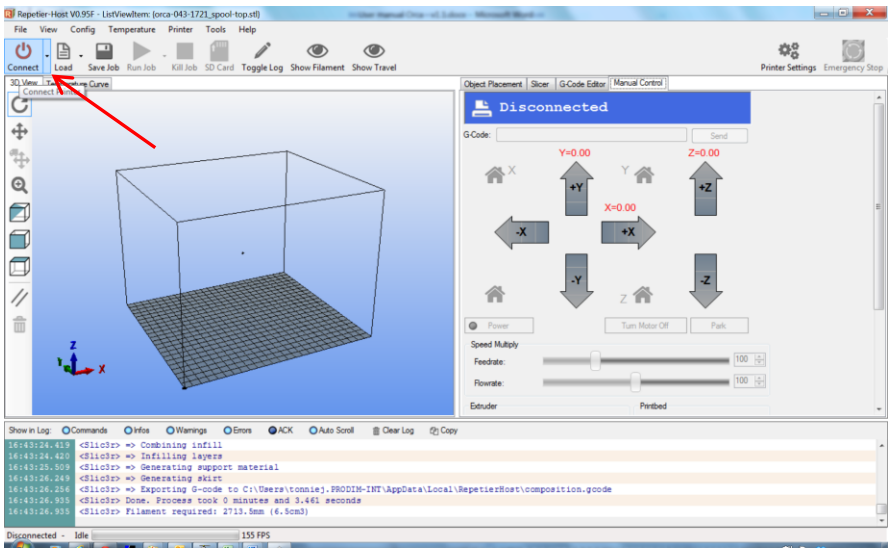


Choose the right Print settings and click Export G-code.

12. Printing

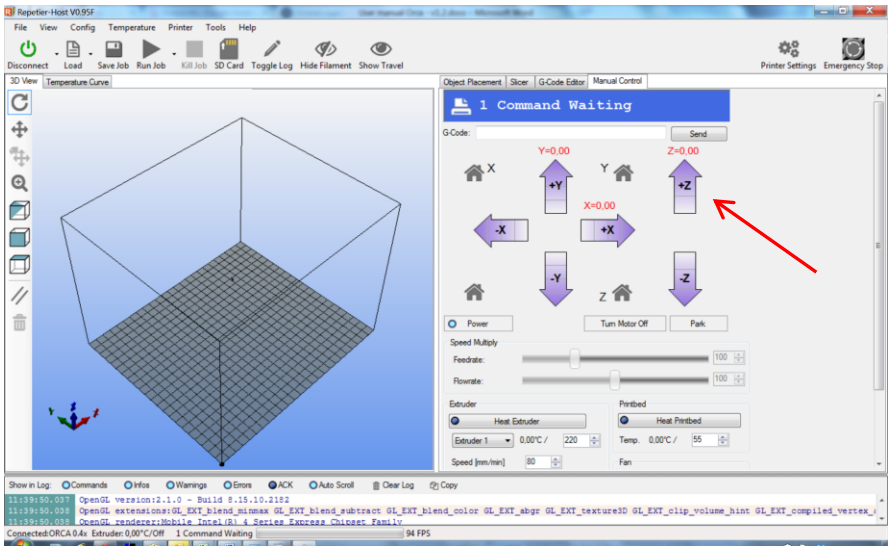
It is always important to start with a clean Printbed. Degrease the Printbed with a towel and e.g. Acetone.

To start printing, the Orcabot XXL must be switched on and connected to the computer via the USB cable. After that click on the button “Connect” in the top left corner.



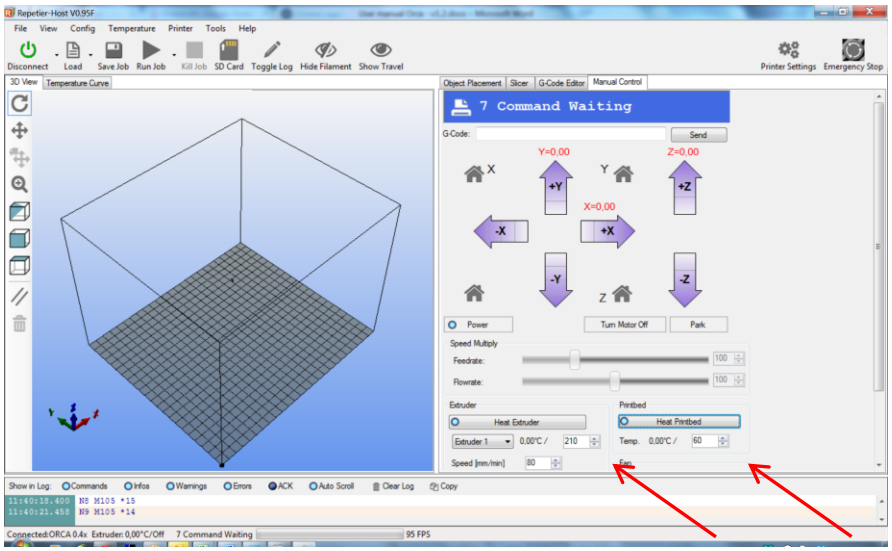
The big “Cross” with the arrows are for manual control of the printer. In the corners you can find the home buttons (homeX, homeY, homeZ and homeALL).

Be careful! Only use homeZ / HomeALL when the Z-is calibrated. Try some arrows and make some moves to make sure that the printer is online and correctly connected.



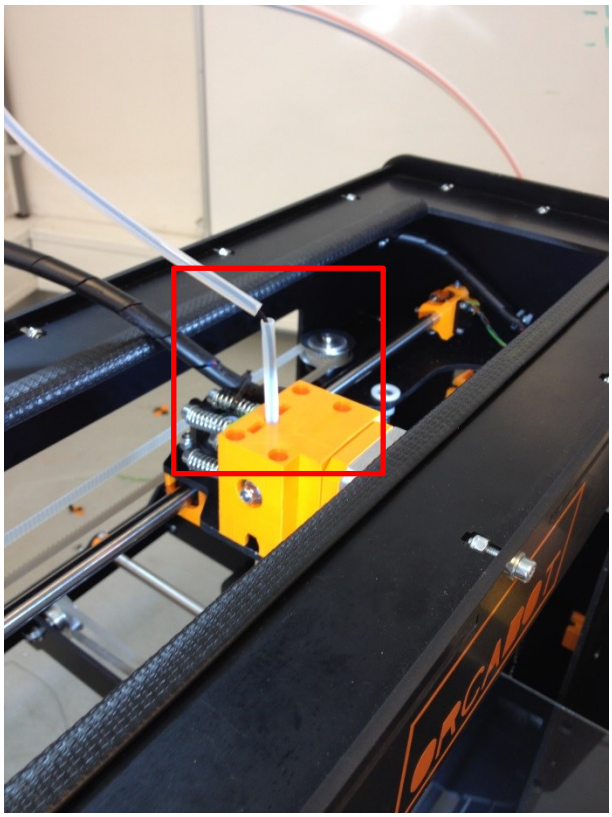
The next step is to set the temperature for the Extruder and the Printbed. First fill in the requested temperature and after that click on the button “Heat Extruder” and “Heat Printbed”. The temperature values in grey are the current temperatures.

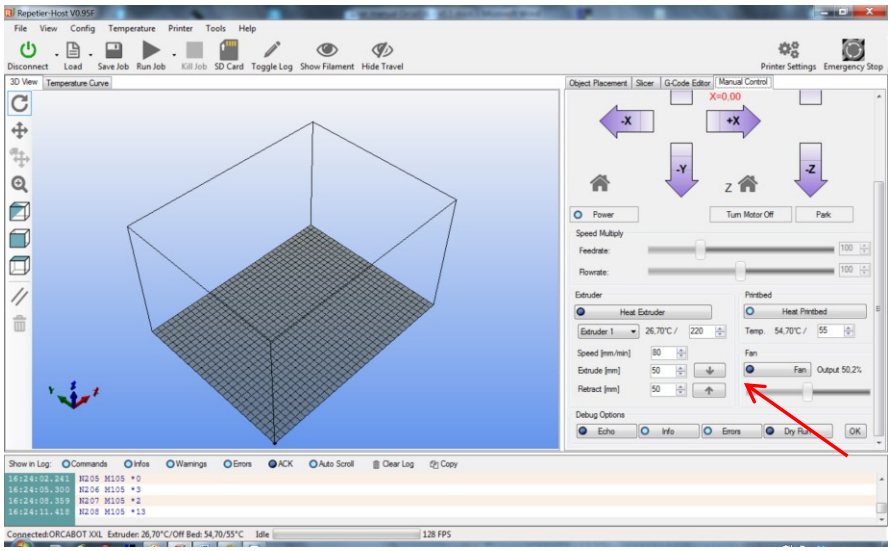
Always wait untill the right temperature is reached before continuing!


Repetier-Host V0.95F
File View Config Temperature Printer Tools Help
Disconnect Load Save Job Run Job Kill Job SD Card Toggle Log Hide Filament Show Travel
Printer Settings Emergency Stop
3D View Temperature Curve
Object Placement Slicer G-Code Editor Manual Control
7 Command Waiting
G-Code: Send
Y=0.00 Z=0.00 X=0.00
+Y +Z +X -X -Y -Z
Power Turn Motor Off Park
Speed Multiply
Feedrate: 100
Flowrate: 100
Extruder Heat Extruder Extruder 1 0.00°C / 210
Printbed Heat Printbed Temp. 0.00°C / 60
Speed [mm/min] 80
Show in Log: Commands Infos Warnings Errors ACK Auto Scroll Clear Log Copy
11:40:18.405 N8 M105 *15
11:40:21.458 N9 M105 *14
Connected:ORCA 0.4x Extruder: 0,00°C/Off 7 Command Waiting 95 FPS

For temperature settings, please go to www.orcabot.com.

If the temperature is reached, the printer is almost ready for printing, but first manually feed the extruder with some material.




Repetier-Host V0.95F
File View Config Temperature Printer Tools Help
Disconnect Load Save Job Run Job Kill Job SD Card Toggle Log Show Filament Hide Travel
Printer Settings Emergency Stop
3D View Temperature Curve
Object Placement Slicer G-Code Editor Manual Control
X=0.00
-X +X -Y -Z Z
Power Turn Motor Off Park
Speed Multiply
Feedrate: 100
Flowrate: 100
Extruder Heat Extruder
Extruder 1 26.70°C / 220
Printbed Heat Printbed
Temp. 54.70°C / 55
Speed [mm/min] 80
Extrude [mm] 50
Retract [mm] 50
Fan Fan Output 50,2%
Debug Options
Echo Info Errors Dry Run OK
Show in Log: Commands Infos Warnings Errors ACK Auto Scroll Clear Log Copy
16:24:02.241 N205 M105 *0
16:24:05.300 N206 M105 *3
16:24:08.359 N207 M105 *2
16:24:11.418 N208 M105 *13
Connected:ORCABOT XXL Extruder: 26,70°C/Off Bed: 54,70/55°C Idle 128 FPS

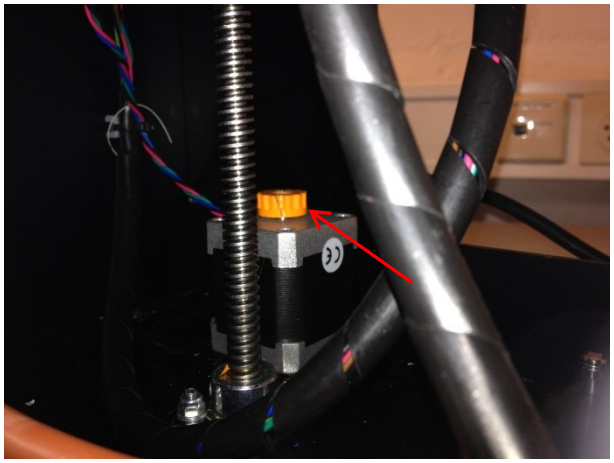
Click in Repetier on the button Extrude for e.g. 50mm. Press the material softly and slowly in the extruder until the extruder takes the material. Feed it until a good amount of material is flowing through the extruder underneath. After this, use tweezers to remove the material.

Warning: ***the heater is very hot, so don't touch it with bare hands!***

Warning: ***never touch the printer bed or extruder with bare hands!***

Always use tweezers or pliers to remove prints from the bed. If the bed is touched with bare hands, it's possible that the bed lose its cohesion. If so, then degrease the bed with acetone.

If this is done, press "Run Job".



While printing, it's always very important to check the first layer and amount of printed material.

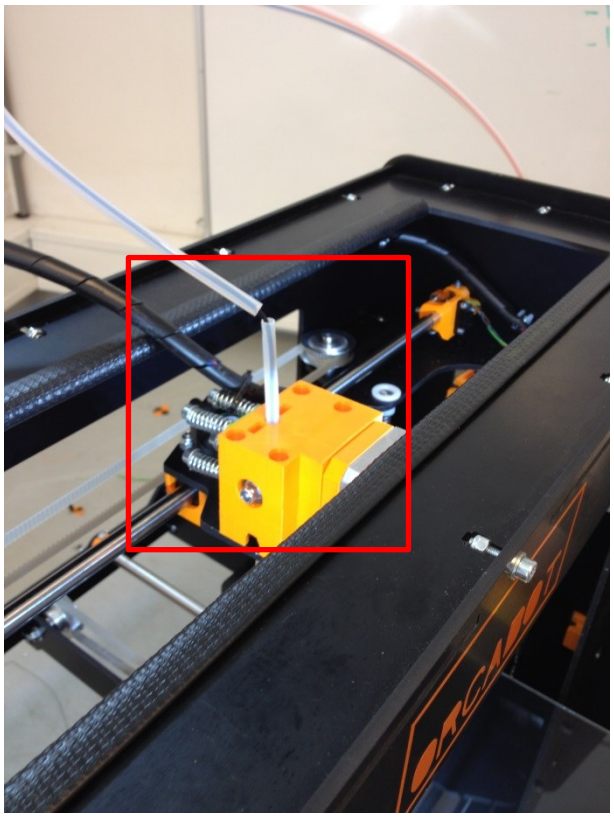
With this wheel on the Z-axis, the height of the bed can be changed (this is only useful for the first layer while printing).

Check the line of material. If it's too thin turn the wheel clockwise to raise the bed a bit. Do this until the lines are completely closed. If the lines are too thick and the material is really "sweeping up", then turn the wheel counter clockwise to lower the bed a bit.

After printing, the machine will automatically cool of and lower and move the bed away from the extruder head. Wait for the machine to cool off and then remove the printed object. Reminder, never touch the bed of extruder with bare hands. Use pliers or tweezers for removing parts (not manually, otherwise you need to degrease again).

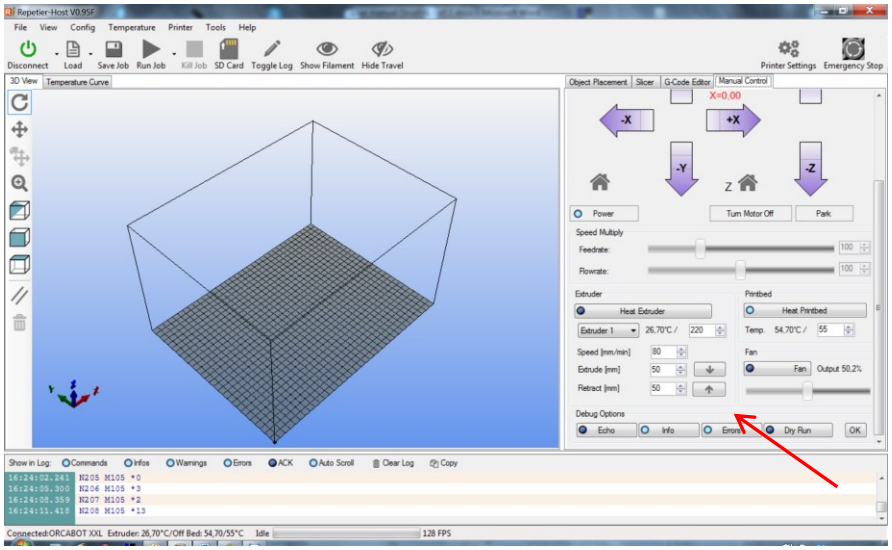
13. Replacing material

If the spool with material is (almost) empty, or when another material or color is wanted, it is time to replace the spool.



Switch on the printer and run Printer interface. Switch on the heater and wait till it has reached its temperature.

Try to leave min. 1 cm filament sticking out. After that, Retract the extruder via the Retract button in Repetier and remove the old filament which was in the extruder. After that insert the new filament.


Repetier-Host V0.95F
File View Config Temperature Printer Tools Help
Disconnect Load Save Job Run Job Kill Job SD Card Toggle Log Show Filament Hide Travel
Printer Settings Emergency Stop
3D View Temperature Curve
Object Placement Slicer G-Code Editor Manual Control
X=0.00
-X +X -Y Z -Z
Power Turn Motor Off Park
Speed Multiply
Feedrate: 100
Flowrate: 100
Extruder
Heat Extruder
Extruder 1 26.70°C / 220
Speed [mm/min] 80
Extrude [mm] 50
Retract [mm] 50
Printbed
Heat Printbed
Temp. 54.70°C / 55
Fan
Fan Output 50.2%
Debug Options
Echo Info Errors Dry Run OK
Show in Log: Commands Infos Warnings Errors ACK Auto Scroll Clear Log Copy
16:24:02.241 N205 M105 *0
16:24:05.309 N206 M105 *3
16:24:08.359 N207 M105 *2
16:24:11.415 N208 M105 *13
Connected:ORCABOT XXL Extruder: 26,70°C/Off Bed: 54,70/55°C Idle
128 FPS

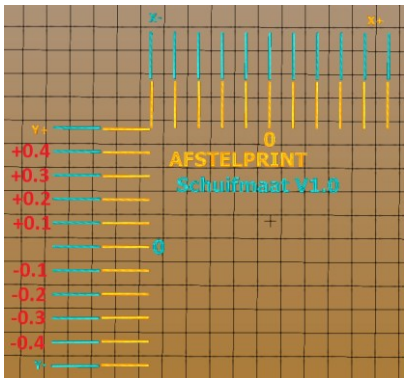
14. Calibration of the 2nd extruder

This manual describes how to calibrate the 2nd extruder according to the 1st extruder.

You can calibrate the extruder by taking the following steps:

Print the calibration print

1. Start the printer and connect the printer with the Orcabot Repetier Host software.
2. Print the calibration print with the dual heads (PLA).



(You can use also a file with double extruder, where you can measure the offsets.)

3. Measure the offsets between the two heads.

Change the offset value

4. Put a USB stick in the Orcabot XXL.
5. Enter manually the command M511 (TAB manual control). The software will copy a .CFG file with settings from the printer to the USB stick.
6. Open the CFG file on a computer. Use Notepad or Wordpad.
7. Change the following line:
8. Extruder_1_offset = x.x, y.y, z.z ;
9. When extruder two has to move for example X -1mm, you have to change the X-value -1mm. The same for the Y and Z. A negative Z offset means the nozzle comes closer to the bed.
10. Save the file again on the USB stick and put the stick in the printer.
11. Enter manually the command M510 to copy the file to the printer.
12. Disconnect the printer.
13. Reboot the printer
14. Home all axis and check the printer.